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Blood cadmium concentrations in the general population of Umbria, central Italy.

dell'Omo M, Muzi G, Piccinini R, Gambelunghe A, Morucci P, Fiordi T, Ambrogi M, Abbritti G

Institute of Occupational Medicine and Toxicology, University of Perugia, Italy. medlav@unipg.it

The aims of this study were (a) to assess blood cadmium (B-Cd) concentrations and to establish a tentative reference interval; (b) to identify significant determinants of B-Cd, in a population from Umbria, Central Italy, which was not occupationally exposed to cadmium (Cd). Four hundred and thirty-four healthy blood-donors volunteered to answer a questionnaire and provide a blood sample for B-Cd analysis, which was performed by graphite furnace atomic absorption spectrophotometry. Blood Cd concentrations ranged from non-detectable values, i.e. below 0.1 microgram/l up to 3.4 micrograms/l and were not normally distributed. The median values and the 95th percentiles were 0.7 and 2.0 micrograms/l, respectively. Concentrations of B-Cd were more than double in smokers than in non-smokers, median values being 1.1 micrograms/l and 0.5 microgram/l, respectively. In current smokers, B-Cd values correlated with the number of cigarettes smoked daily ($rs = 0.40$, $P = 0.0001$) and with the cumulative exposure to cigarette smoke ($rs = 0.35$, $P = 0.0001$). Concentrations of B-Cd correlated with age in the non-smokers, but not in the smokers and were significantly higher in women than in men only in the non-smokers. Both in smokers and non-smokers, B-Cd concentrations were similar in subjects living in urban or in rural areas. In the whole study population the lower and the upper tentative reference limit were < 0.1 and 2.2 micrograms/l, respectively, as computed by a non-parametric rank-based method. The upper limit was approximately double in smokers than in non-smokers (3.1 micrograms/l and 1.6 micrograms/l, respectively). Our results show that B-Cd concentrations in a general population from Umbria are in the range reported for general populations in Northern Italy and other European Countries. Smoking was the strongest determinant of B-Cd concentrations and age had a lesser effect.

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